

Bacteria Total Maximum Daily Load Studies for Hunting Creek, Cameron Run, and Holmes Run



Informational Meeting
July 29, 2010



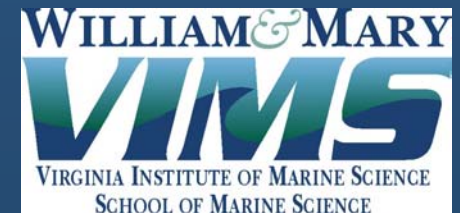
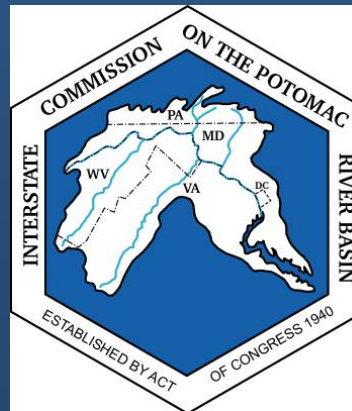
Why are we here?

Hunting Creek, Cameron Run, and Holmes Run do not meet water quality standards

- Where are these streams located?
- How do we know standards aren't being met?
- Why don't these streams meet standards?
- What is being done to correct the problem?

Project Team

- Virginia Department of Environmental Quality
- Interstate Commission on the Potomac River Basin
- Virginia Institute of Marine Science



Agenda

- TMDL Background
- Cameron Run and Holmes Run TMDLs
- Hunting Creek TMDL
- TMDL Implementation
- Questions and Discussion

How do we know if water bodies in Virginia are healthy?

- Perform physical and chemical monitoring on water bodies throughout the state.
- Monitor parameters such as:
 - pH
 - Temperature
 - Dissolved Oxygen
 - Biological Community
 - Bacteria
 - Nutrients
 - Fish Tissues
 - Metals/Toxic Pollutants



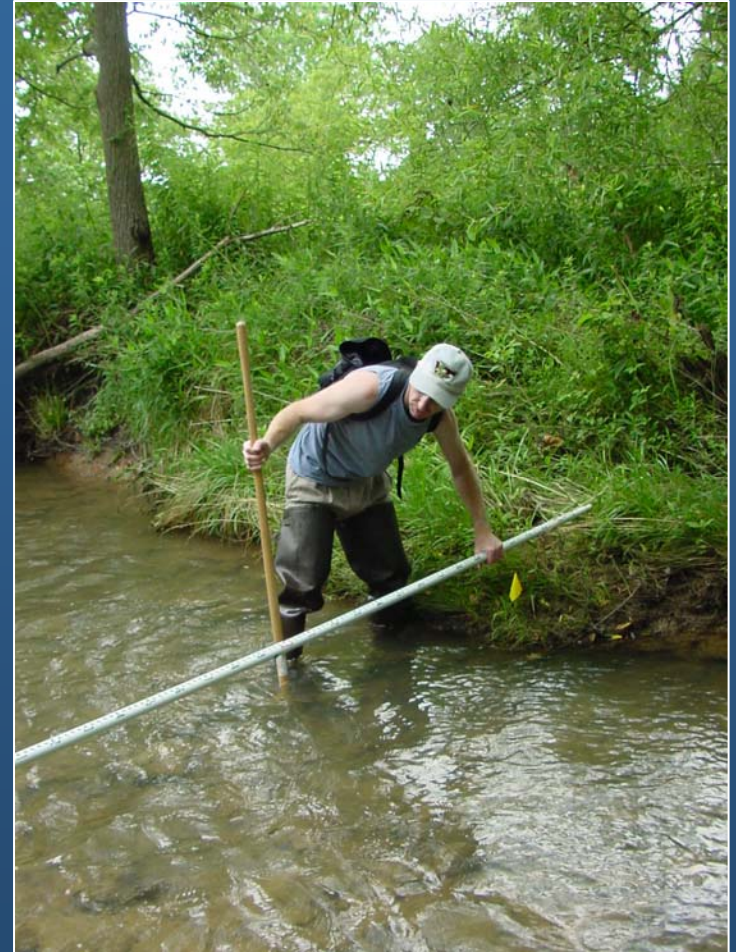
What does DEQ do with the monitoring data that is collected?

Compare the data collected to the water quality standards.

Assessment Performed Once Every Two Years.

Water Quality Standards:

- Regulations based on federal and state law.
- Set numeric and narrative limits on pollutants.
- Consist of designated use(s) and water quality criteria to protect the designated uses.



Designated Uses

- Recreational
- Public Water Supply
- Wildlife
- Fish Consumption
- Shellfish
- Aquatic Life



Recreational Use Impairment

What are Fecal Coliform and *E. coli* Bacteria?

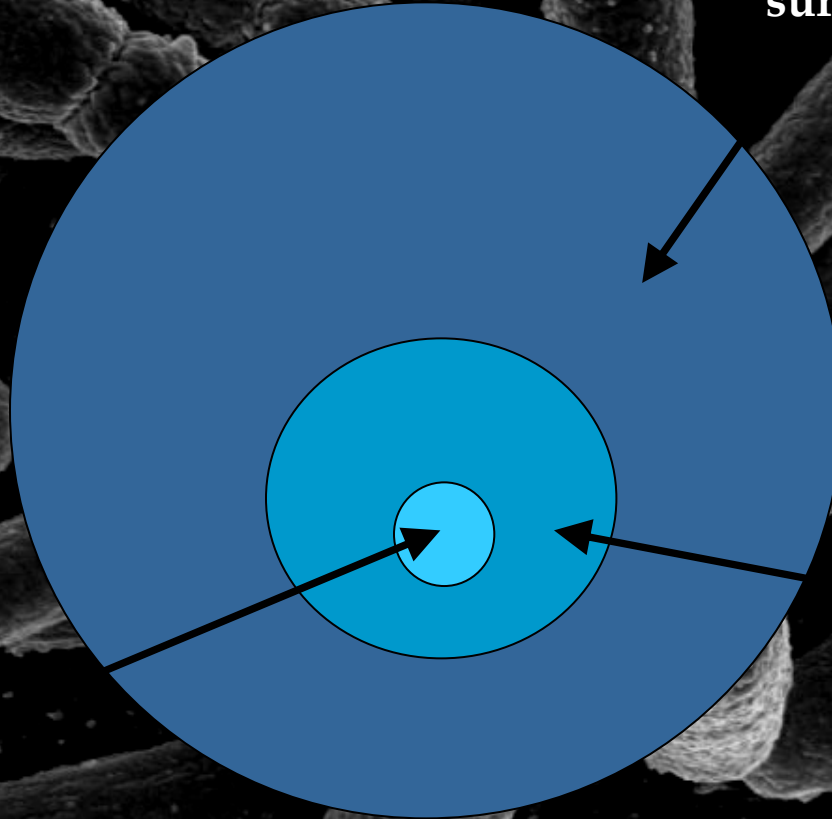
Coliform Bacteria:
Commonly found in soil, decaying vegetation, animal feces, and raw surface water

***Escherichia coli*:**

- Subset of fecal coliform bacteria
- Correlate better with swimming associated illness

Fecal Coliform:

- Found in the digestive tract of humans and warm blooded animals
- Indicator of the potential presence of pathogens in water bodies



Potential Sources of Fecal Coliform Bacteria



What happens when a water body doesn't meet water quality standards?

- Waterbody is listed as “impaired” and placed on the 303(d) list.
- Once a water body is listed as impaired, a Total Maximum Daily Load value must be developed for that impaired stream segment to address the designated use impairment.
- TMDL Studies are required by law:
 - 1972 Clean Water Act (CWA)
 - 1997 Water Quality Monitoring Information and Restoration Act (WQMIRA)

What is a TMDL ?

Total Maximum Daily Load

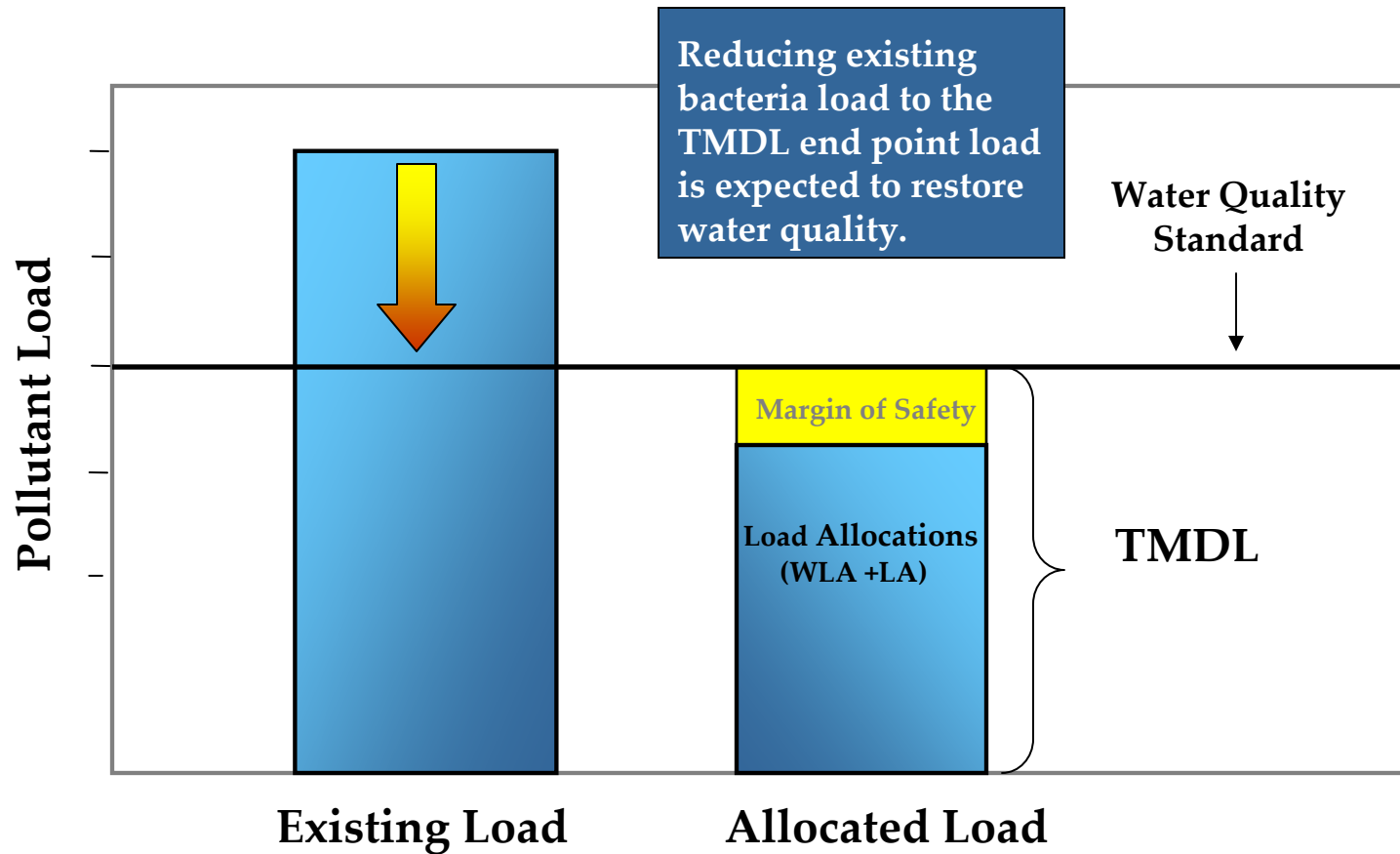
$$\text{TMDL} = \text{Sum of WLA} + \text{Sum of LA} + \text{MOS}$$

Where:

TMDL	=	Total Maximum Daily Load
WLA	=	Waste Load Allocation (point sources)
LA	=	Load Allocation (nonpoint sources)
MOS	=	Margin of Safety

The TMDL represents the total amount of a certain pollutant a waterbody can receive and still meet water quality standards.

An Example TMDL



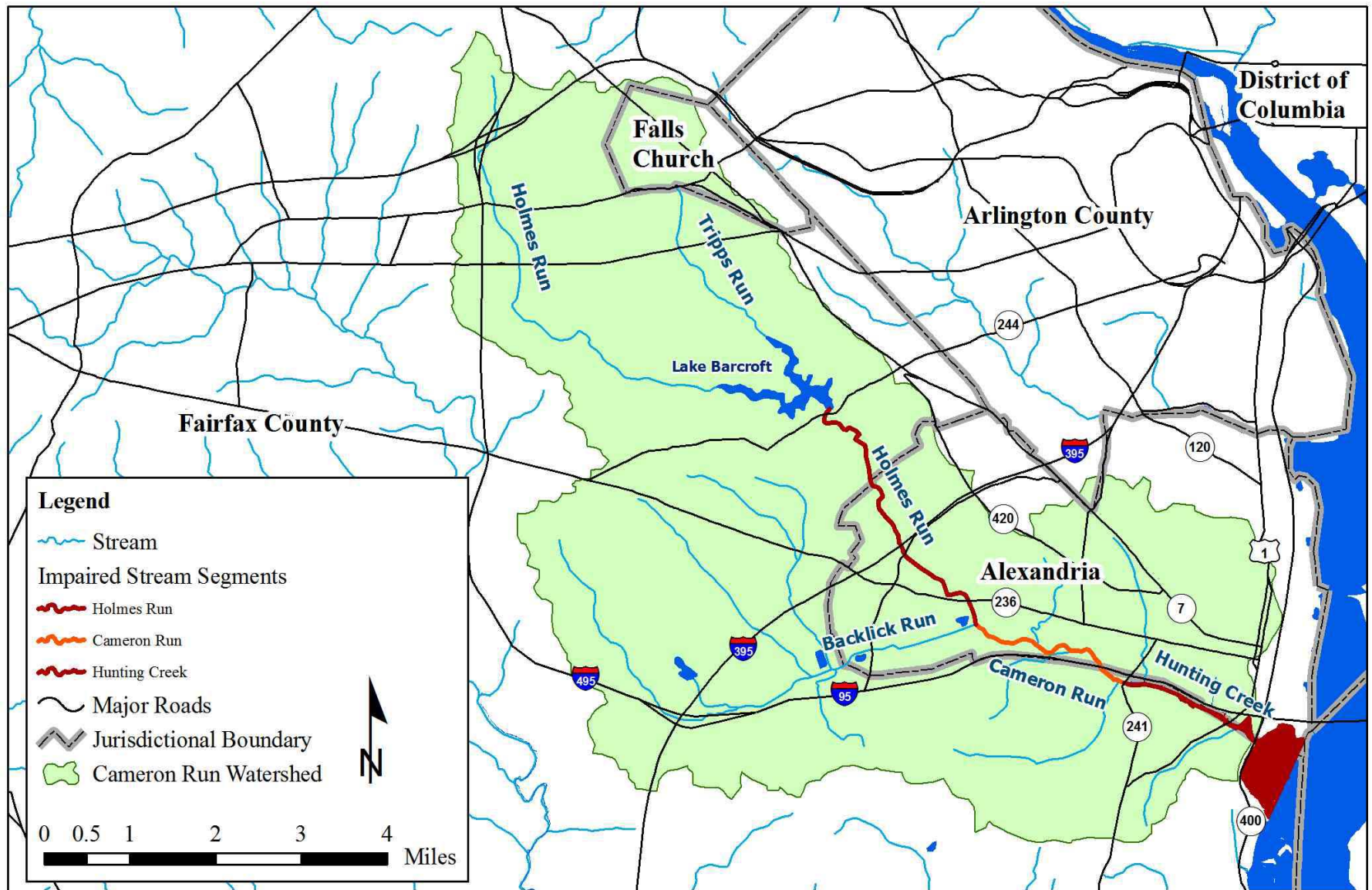
Impairment Listings

- The water quality criterion for *E. coli* bacteria is a Geometric Mean of 126 cfu/100. Must have four or more weekly samples in a month to calculate a geometric mean.
- If insufficient data are available to calculate a geometric mean, a maximum criterion of 235 cfu/100mL is used to assess the data.

Stream Name	Area	Upstream Limit	Downstream Limit	DEQ Monitoring Stations	Exceedance Rate*
Hunting Creek (Tidal)	0.53 square miles	Route 241 (Telegraph Road) Bridge Crossing	Confluence with the Potomac River	Station 1aHUT000.01 <i>(Located at the George Washington Memorial Parkway)</i> Station 1aHUT001.72 <i>(Located at Telegraph Road)</i>	11 of 17 samples <i>(40.7% exceedance)</i> 3 of 11 samples <i>(27.3% exceedance)</i>
Cameron Run (Non-Tidal)	2.08 miles	Confluence with Backlick Run	Route 241 (Telegraph Road) Bridge Crossing	Station 1aCAM002.92 <i>(Located at Eisenhower Avenue)</i>	5 of 18 samples <i>(27.8% exceedance)</i>
Holmes Run (Non-Tidal)	3.58 miles	Mouth of Lake Barcroft	Confluence with Backlick Run	Station 1aHOR001.04 <i>(Located at Pickett Street)</i>	3 of 12 samples <i>(25% exceedance)</i>

* Exceedance rates taken from the 2008 Integrated Assessment, which looked at data from 01/01/2001 to 12/31/2006.

Location of Impaired Segments



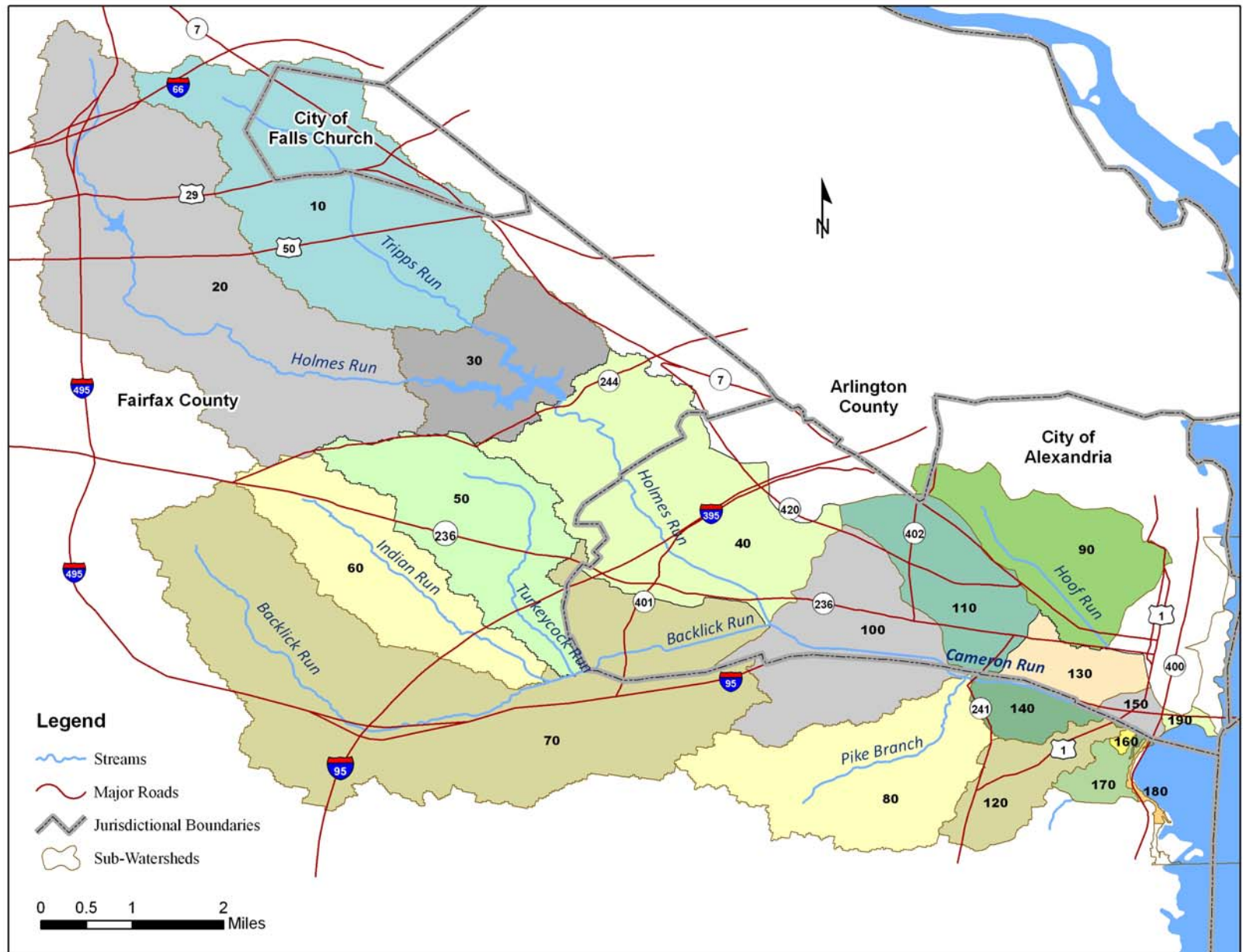
Project Schedule

- Project initiated in 2009
- Meetings:
 - Technical Advisory Committee Meetings
 - March 2009, June 2009, June 2010
 - Public Meetings
 - March 2009, June 2010, July 2010
 - Specific Stakeholder Meetings and Conference Calls
 - February 2010, June 2010, July 2010
- Information Sharing:
 - DEQ Website: <http://www.deq.virginia.gov/tmdl/develop.html>
 - FTP Site: <ftp://ftp.deq.virginia.gov/wps/PERMIT/NRO/Hunting%20Creek%20TMDL/>
- Schedule for Project Completion
 - Public Comment Period extends until August 18, 2010
 - Final TMDL Report due to EPA by October 1, 2010

TMDL Development Methodology

- Collected data and performed a watershed assessment.
- Evaluated the sources of bacteria in the watershed.
- Used computer models to determine the bacteria reductions required to meet water quality standards
 - HSPF non-tidal model
 - ELCIRC tidal model

HSPF Model Segmentation for Hunting Creek Watershed



Holmes Run and Cameron Run TMDLs

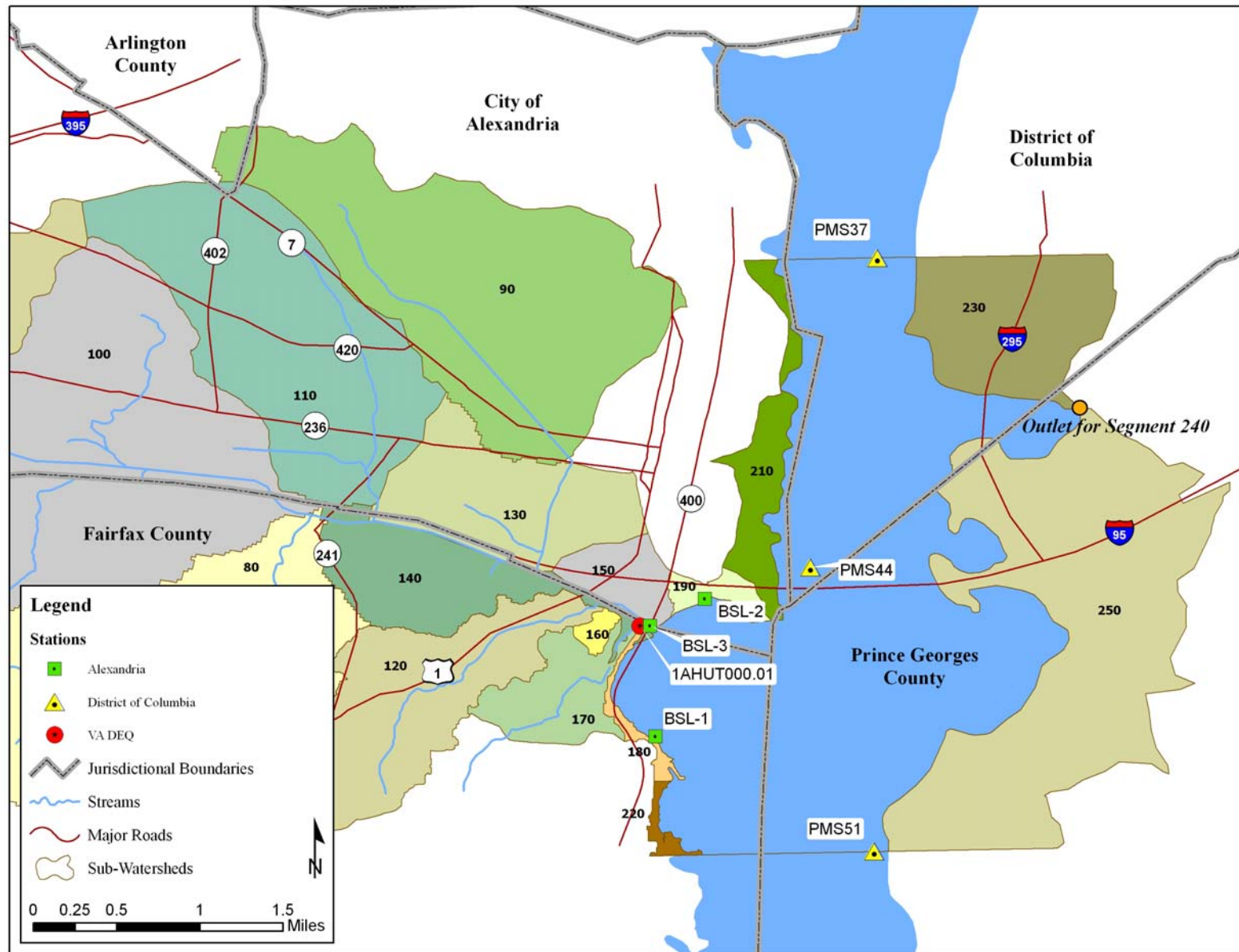
Human Sources Reduction <i>(Sanitary Sewer Overflows and Failing Septic Systems)</i>	Wildlife Reduction <i>(Direct Deposition)</i>	Land Based Reduction <i>(Wildlife, pets)</i>	Exceedance Rate <i>(Monthly Geometric Mean)</i>
100%	50%	83%	0%

Holmes Run TMDL (cfu/year) for <i>E. coli</i> Bacteria			
WLA	LA	MOS	TMDL
8.38E+13	8.99 E+12	Implicit	9.28E+13

Cameron Run TMDL (cfu/year) for <i>E. coli</i> Bacteria			
WLA	LA	MOS	TMDL
1.33E+14	1.98 E+13	Implicit	1.53E+14

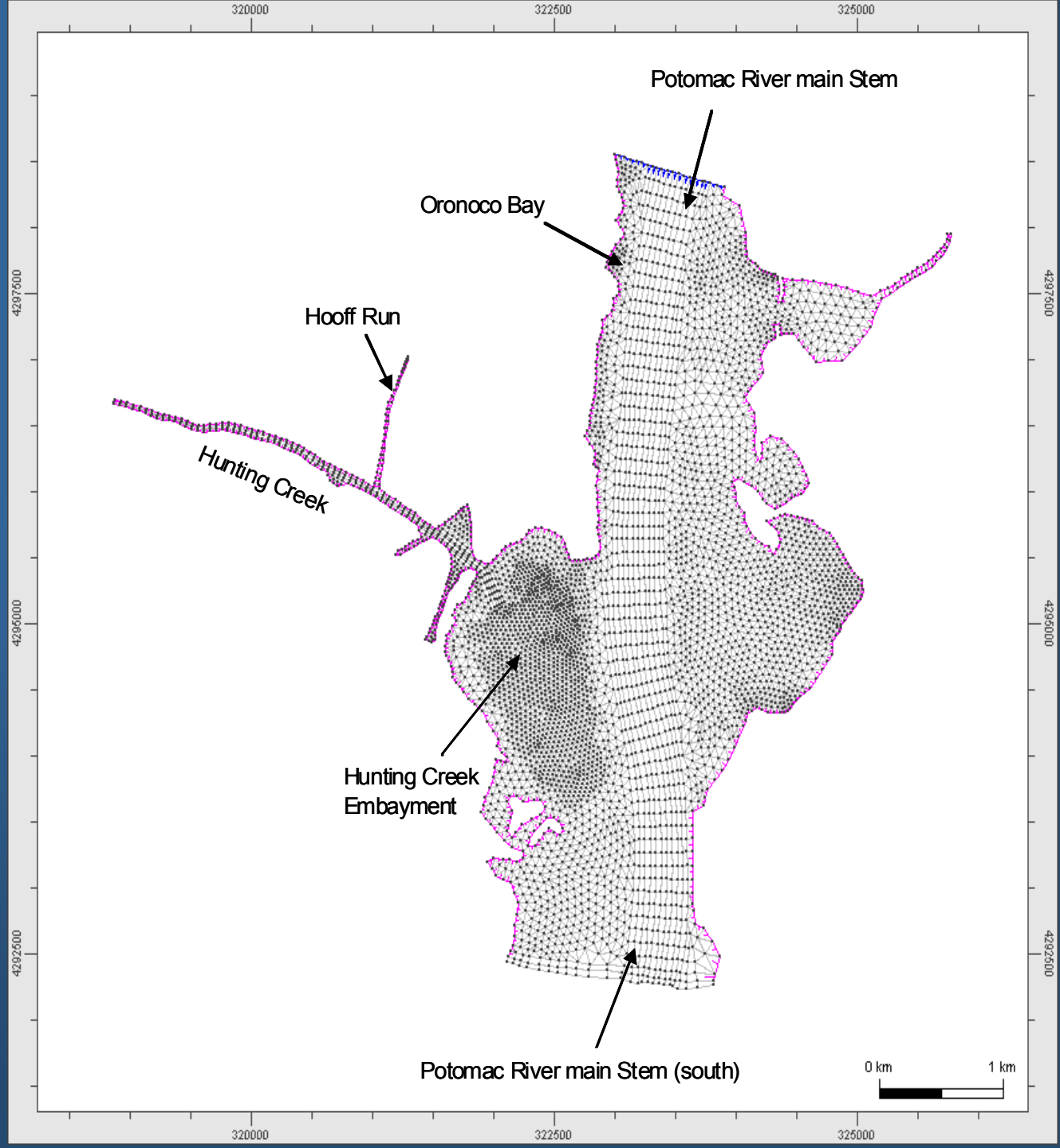
** A public meeting was held on June 30, 2010 that presented the details of the Holmes Run and Cameron Run TMDLs. The presentation from that meeting is available online at: <http://www.deq.virginia.gov/export/sites/default/tmdl/pptpdf/huntcamholimp2.pdf>*

HSPF Model Segmentation for Hunting Creek and the Potomac River



Hunting Creek ELCIRC Model

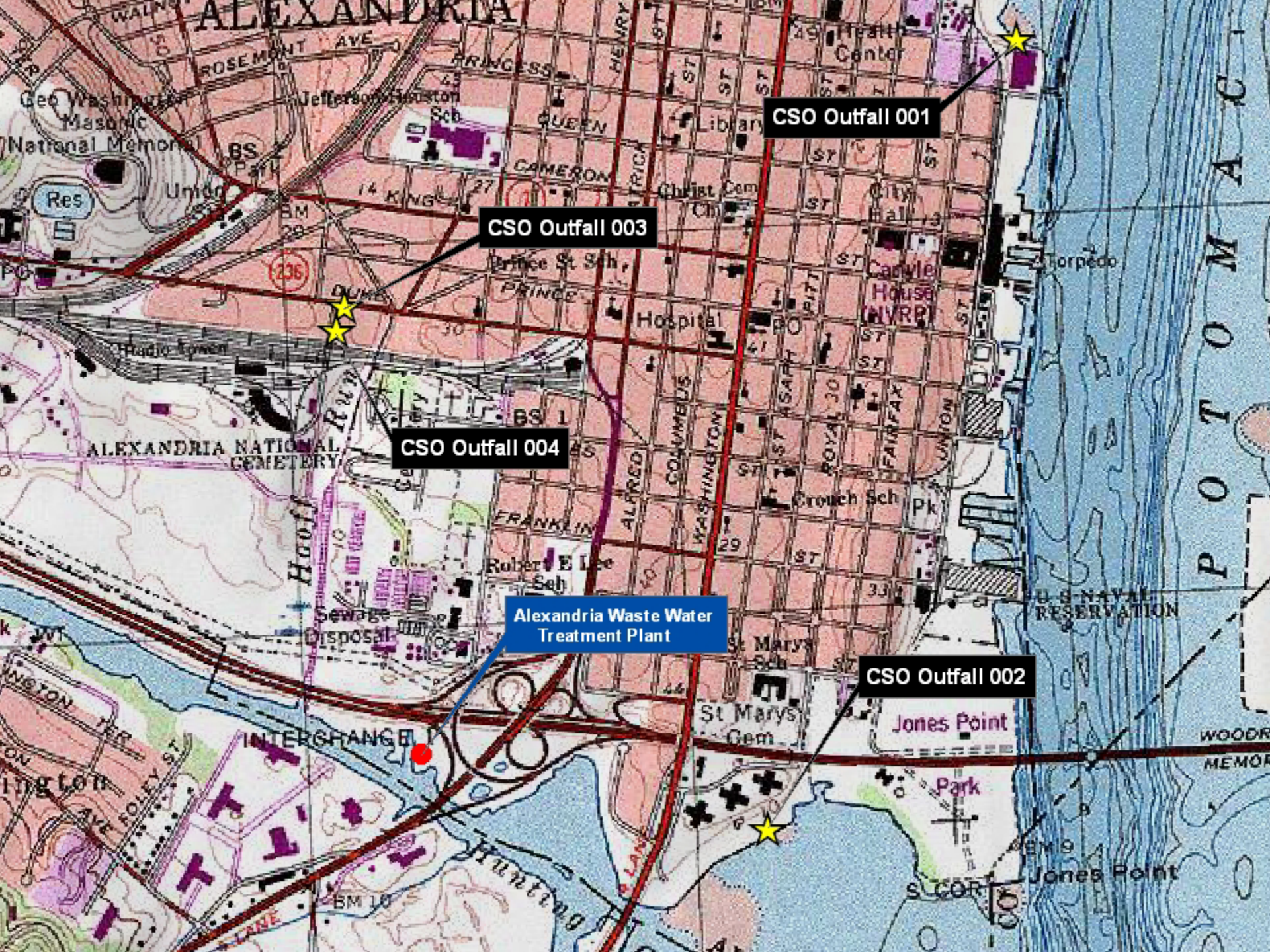
- Model domain includes tidal Hunting Creek and Potomac River
- Helps to understand hydrology and pollutant transport and fate
- Used to establish the TMDL based on 2004 and 2005 model years.



Bacteria Sources in the Hunting Creek Watershed*

- Alexandria Waste Water Treatment Plant
- Alexandria's Combined Sewer System
- Sanitary Sewer Overflows
- Failing Septic Systems
- Pets
- Wildlife

*Bacteria sources outside of Hunting Creek but within the model domain were included in the model.



CSO Outfall 001

CSO Outfall 003

CSO Outfall 004

Alexandria Waste Water Treatment Plant

CSO Outfall 002

What is a Combined Sewer System?

- Sewers designed to collect stormwater runoff and domestic sewage in the same pipe.
- Under normal flows, wastewater is transported to a treatment plant.
- Under high flow/storm event, if treatment capacity of the WWTP is exceeded, wastewater is discharged directly to stream.
- Combined Sewer Overflow (CSO) events contain stormwater and untreated human waste.



Challenges of the Hunting Creek TMDL

- **Very complicated project**
- **Regulatory, policy, and technical challenges**
 - **Statutory and regulatory provisions, especially as applicable to the CSO**
 - **Upstream and Downstream Model Domain Boundaries**
 - **Boundary of Hunting Creek with the Potomac**
 - **How to assess against water quality standards**
- **We have worked with stakeholders to address challenges.**

Hunting Creek TMDL

Hunting Creek TMDL (cfu/year) for <i>E. coli</i> Bacteria			
WLA	LA	MOS	TMDL
3.24E+14	2.23 E+13	Implicit	3.46E+14

Reductions in Upstream Loads (Segment 100) and Direct Drainage (Segments 120, 140, 160-180)			Reductions in Hooff Run Loads (Segment 90) and Direct Drainage (Segments 110, 130, 150, and 190)			CSO Reductions	
Human	Direct Deposition Wildlife	Land Based Loads (Runoff)	Human	Direct Deposition Wildlife	Land Based Loads (Runoff)	Outfall 002	Outfall 003 Outfall 004
100%	50%	83%	100%	50%	98%	80%	99%

** No reductions are required from the Alexandria Waste Water Treatment Plant because their permit requires them to discharge at water quality standards.*

How Can these Reductions be Achieved?

- **Point Sources:**
 - MS4 Permits and VPDES Permits
 - Mechanism for achieving required reductions is through permitting process.
- **Non-Point Sources:**
 - TMDL Implementation Plan:
 - Required by State Law (WQMIRA 1997*).
 - Strategy for how to make reductions required by the TMDL Study.
 - Relies heavily on public participation.
 - Creates measurable goals and milestones to track the progress of the implementation.
 - Incorporates Best Management Practices (BMPs) to achieve reductions.

**WQMIRA: Water Quality Monitoring Information and Restoration Act*

Potential Implementation Plan Measures

- Proper Pet Waste Management
- Sanitary Sewer Maintenance and Inspections
- Stormwater Treatment
- Stream Corridor Restoration
- Education and Outreach
- Monitoring Programs



More information on TMDL Implementation Plans can be found on the DEQ website:

<http://www.deq.virginia.gov/tmdl/implement.html>

In the Meantime...

- Citizen monitoring
- Pick up after your pet
- Educate others



Comment Period on Draft TMDL Report for Hunting Creek, Cameron Run, and Holmes Run

- July 19, 2010 to August 18, 2010
- Draft Report is available on the DEQ website:
<http://www.deq.virginia.gov/tmdl/drftmdls/huntingec.pdf>
- Comments should be submitted in writing to:
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